Help Center

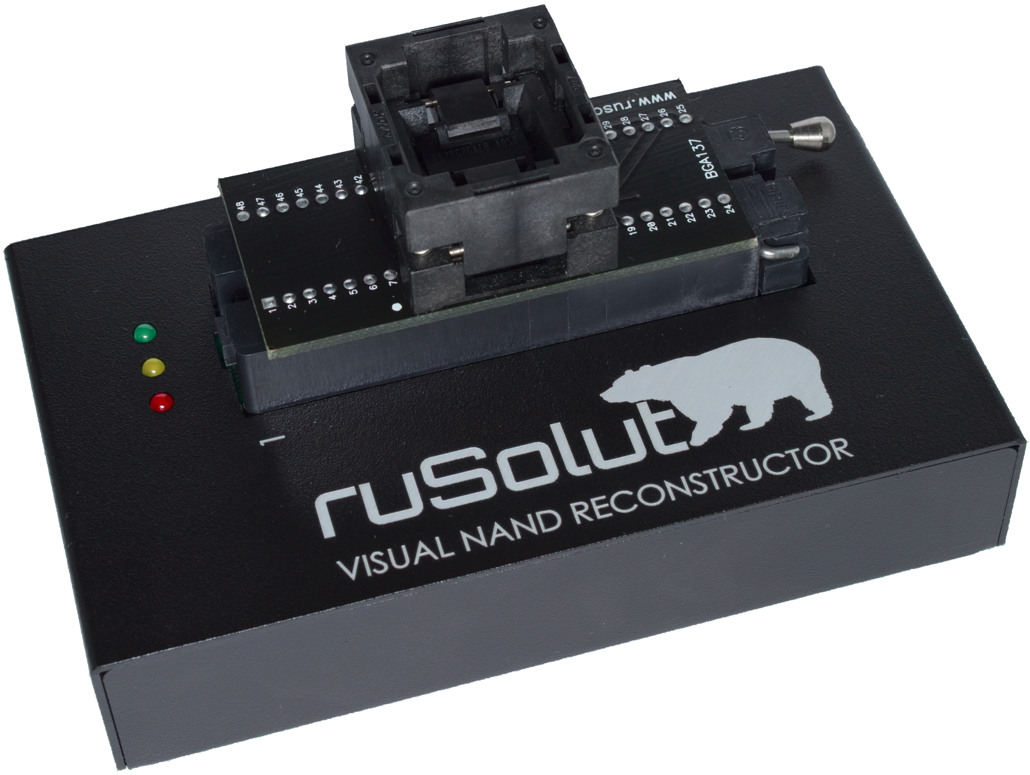
Chip reading

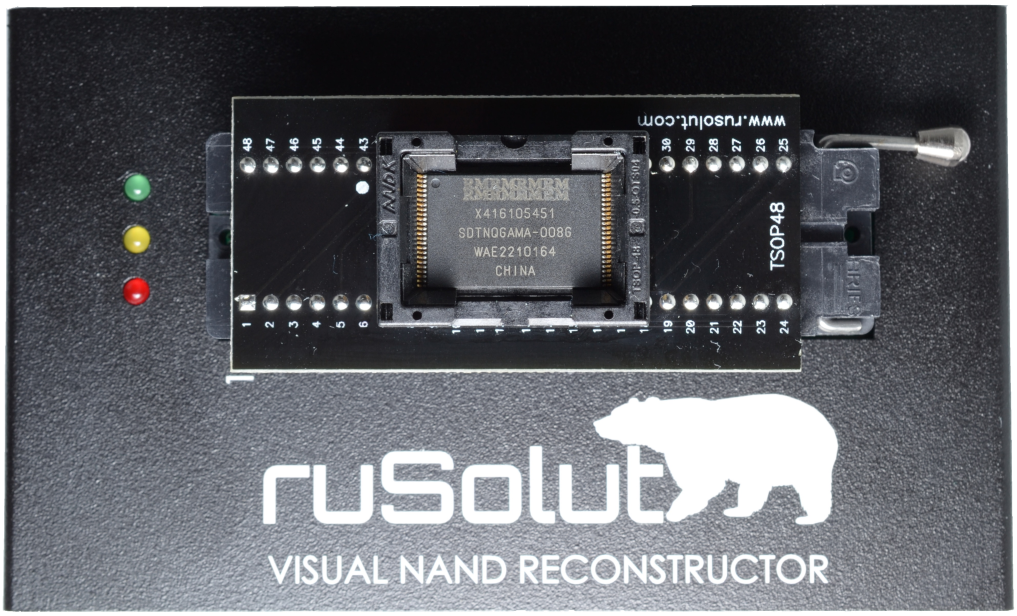
Reading dumps from chips

Visual inspection of memory chip should precede plugging it to the Reader and adapters. Checking pins and pads is a mandatory process. Bent pins should be adjusted properly. In case of severe damage (e.g. broken pins or pads), physical image extraction becomes more complex. If important pin/pad is destroyed, it may be necessary to solder chip onto Monolith adapter.

The memory chip itself should be cleaned and deprived of any contamination. For BGA chips it’s recommended to use solder wick in couple with soldering iron and then clean the chip with IPA 99%. In case of TSOP chips, use solder wick to remove soldering alloy. In order to clean micro contamination on TSOP pins the fiberglass pen or brush can be used then IPA 99% should be applied. According to the package of chip, appropriate adapter should be selected.

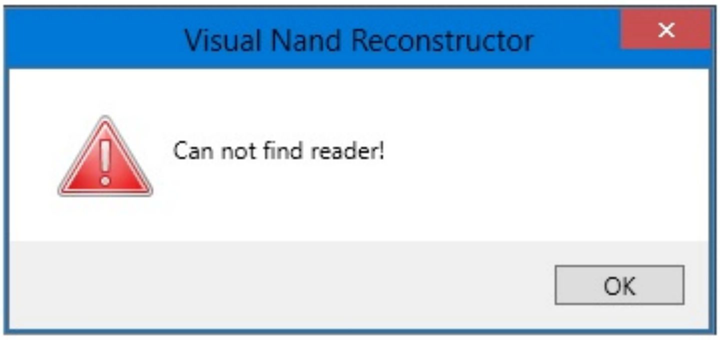
Once it’s found and chip is plugged into adapter, connection of adapter to the Reader should take place. There’s a special marker symbolizing pin 1 located on the Reader. Placing adapters in wrong orientation could harm the flash memory.
(pin 1 & pin-point in the correct order)


BGA137
www.rusolut.com
ruSolut
VISUAL NAND RECONSTRUCTOR


www.rusolut.com
TSOP48
X416105451
SDTNQGAMA-008G
WAE2210164
CHINA
ruSolut
VISUAL NAND RECONSTRUCTOR

The Visual NAND Reconstructor supports most models of chips of all major brands. There are specially designed adapters for most of them. List of available adapters: https://rusolut.com/visual-nand-reconstructor/nand-adapters/

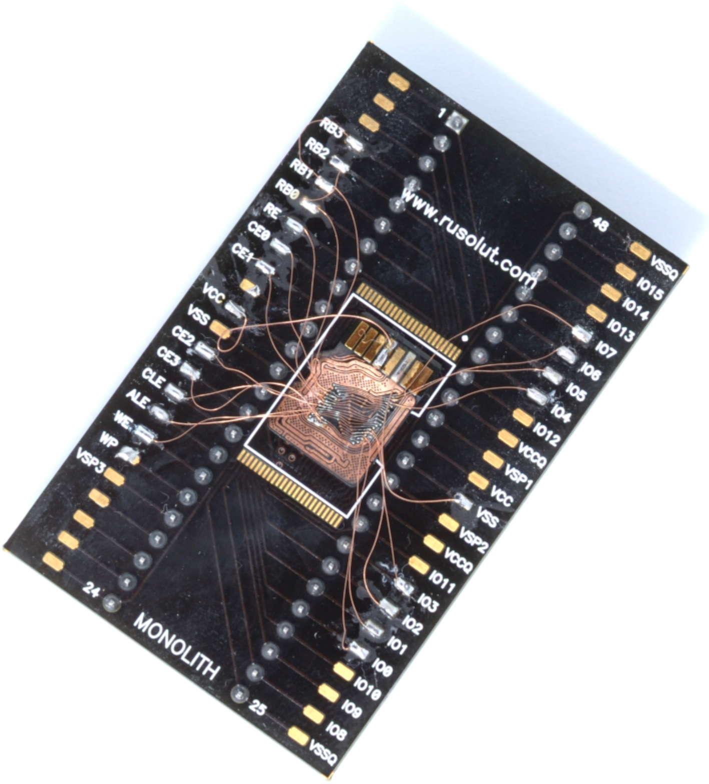
Once the chip and adapter inserted, the Reader should be connected to the computer. If it's not, the VNR software will display the following error:


Visual Nand Reconstructor
OK

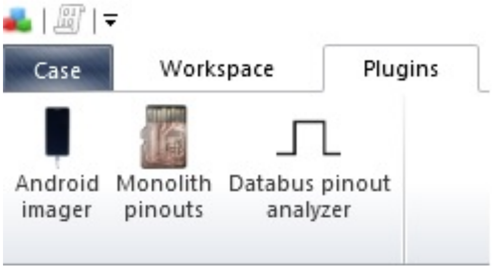
Can not find reader!

Monolithic devices/Non-standard packages

In case of devices that have unusual pinout and they are not supported via adapter's it's necessary to solder device to MONOLITH adapter according to pinout in our built-in database.

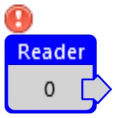

www.rusolut.com
MONOLITH
1
24
25
48
RB3
RB2
RB1
RB0
RE
CE0
CE1
VCC
VSS
CE2
CE3
CLE
ALE
WE
WP
VSP3
VSSQ
IO15
IO14
IO13
IO7
IO6
IO5
IO4
IO12
VCCQ
VSP1
VCC
VSS
VSP2
VCCQ
IO11
IO3
IO2
IO1
IO0
IO10
IO9
IO8
VSSQ

To open database go to 'Plugins' tab and then open 'Monolith pinouts'.


Case
Workspace
Plugins
Android imager
Monolith pinouts
Databus pinout analyzer

Chip configuration

When everything is set up correctly, the VNR should be opened and the Reader element will appear automatically.

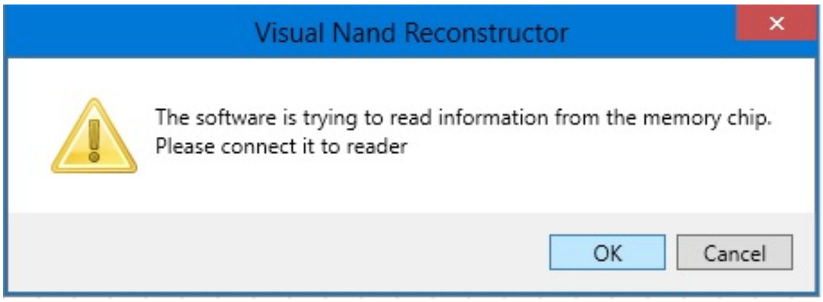


(“!” indicates need for your attention, pointing mouse on icon display recommended action)

In order to read out the flash memory, retrieving ID number using “Read memory chips” function is necessary. Execution of this function should display tab with ID and number of Crystals (Dies, CE, layers, etc).

Read memory chips

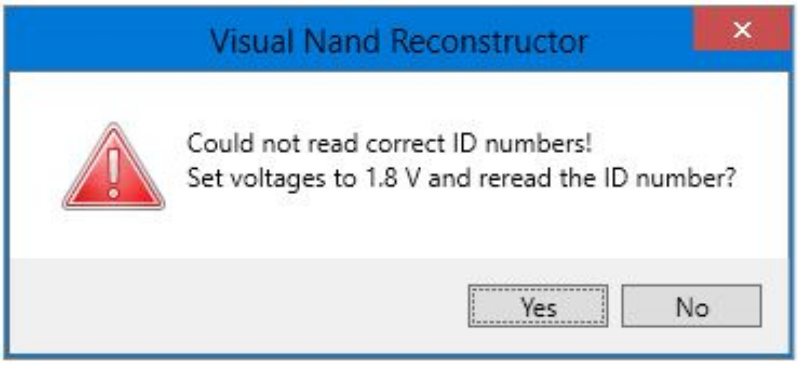
After execution of this function VNR display information. This is the good moment to check if chip is properly placed in adapter and adapter in reader.



The software is trying to read information from the memory chip.
Please connect it to reader

If everything is correctly placed, simply click 'OK' and VNR start reading chip.

In case of invalid ID, the VNR will display a window requesting voltage adjustment.



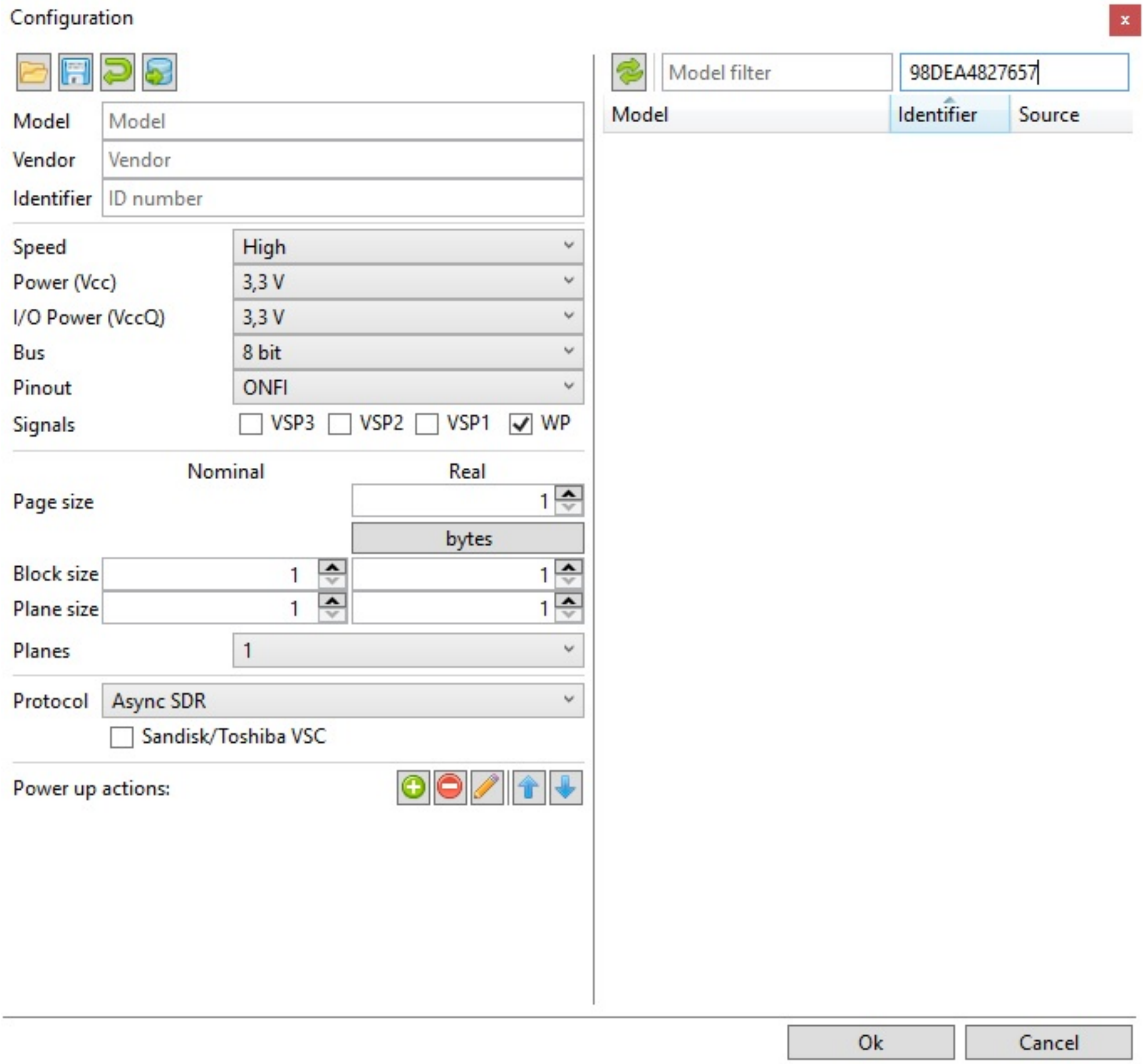
Could not read correct ID numbers!
Set voltages to 1.8 V and reread the ID number?

If ID is not recognized, the following need to be checked:

- If your chip is high capacity Micron BGA memory, BGA 137, BGA 107, it may be necessary to adjust voltage to 1.8V
- Some chips sometimes require higher voltage. There was a case when Toshiba 0x983AA89276 worked normally with 4.0V only
- Proper chip connection and alignment (some chips have to be cleaned several times)
- Pin-points orientation (pin 1 location)

Usage of any VNR adapter does not require BGA chip re-balling, it is enough to flatten the surface of chip.

Another situation that may appear is that ID was red properly but there is no configuration file in database, like in example below.



Configuration

Model: Model
Vendor: Vendor
Identifier: ID number

Speed: High
Power (Vcc): 3,3 V
I/O Power (VccQ): 3,3 V
Bus: 8 bit
Pinout: ONFI
Signals: ☐ VSP3 ☐ VSP2 ☐ VSP1 ☑ WP

	Nominal	Real
Page size		1 bytes
Block size	1	1
Plane size	1	1

Planes: 1

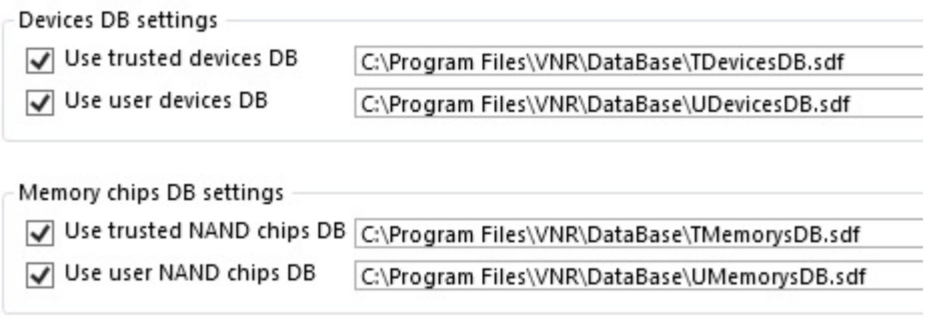
Protocol: Async SDR
☐ Sandisk/Toshiba VSC

Power up actions:

Model filter: 98DEA4827657

Model	Identifier	Source

In that situation make sure that you have properly connected database. Every checkbox should be checked and also make sure that you have the newest version.

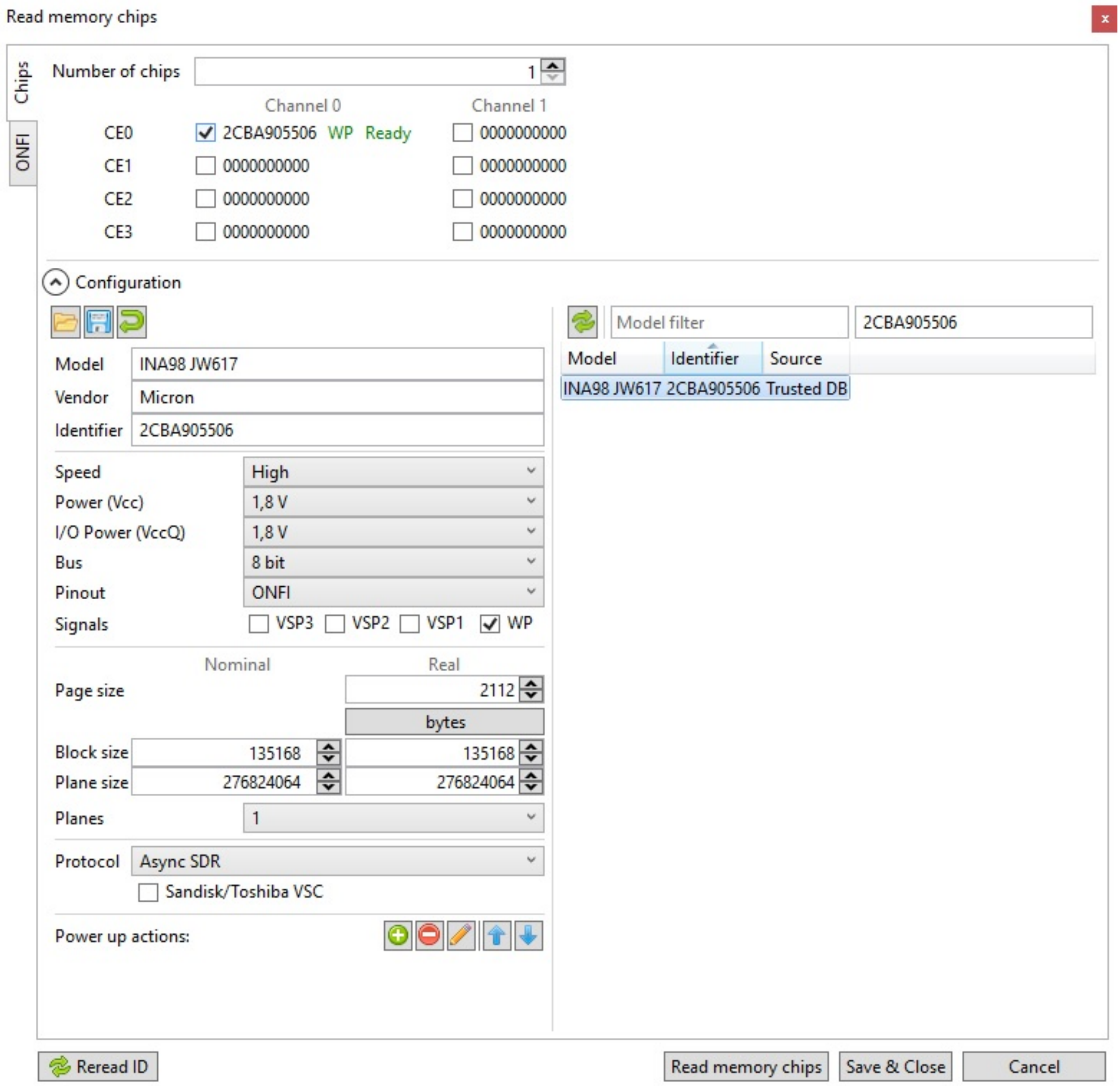


Devices DB settings
☑ Use trusted devices DB C:\Program Files\VNR\DataBase\TDevicesDB.sdf
☑ Use user devices DB C:\Program Files\VNR\DataBase\UDevicesDB.sdf

Memory chips DB settings
☑ Use trusted NAND chips DB C:\Program Files\VNR\DataBase\TMemorysDB.sdf
☑ Use user NAND chips DB C:\Program Files\VNR\DataBase\UMemorysDB.sdf

When you are sure that your Database is properly connected and there is newest version, but this situation repeat, so there is probability that we don't have this device in database. In that case just create a ticket in Help Center according to Guidelines.

If everything is fine, software should display window (e.g. below) with chip ID, number of crystals and it's configuration.


Read memory chips
×
Chips
ONFI
Configuration
Model filter
Power up actions:
Reread ID
Read memory chips
Save & Close
Cancel

Number of chips: 1

	Channel 0	Channel 1
CE0	☑ 2CBA905506 WP Ready	☐ 0000000000
CE1	☐ 0000000000	☐ 0000000000
CE2	☐ 0000000000	☐ 0000000000
CE3	☐ 0000000000	☐ 0000000000

Model: INA98 JW617
Vendor: Micron
Identifier: 2CBA905506
Speed: High
Power (Vcc): 1,8 V
I/O Power (VccQ): 1,8 V
Bus: 8 bit
Pinout: ONFI
Signals: ☐ VSP3 ☐ VSP2 ☐ VSP1 ☑ WP

	Nominal	Real
Page size		2112 bytes
Block size	135168	135168
Plane size	276824064	276824064

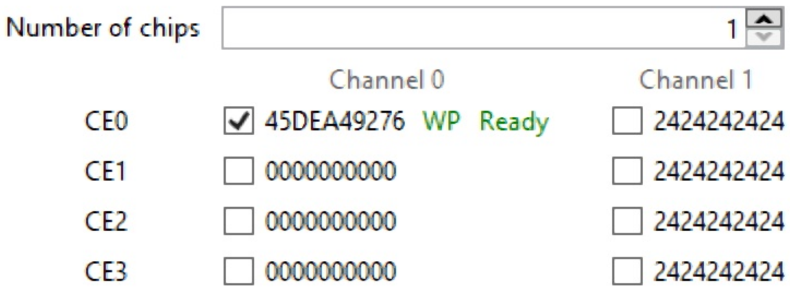
Planes: 1
Protocol: Async SDR
☐ Sandisk/Toshiba VSC

Model filter: 2CBA905506

Model	Identifier	Source
INA98 JW617	2CBA905506	Trusted DB

This window contain of three sections:

Chip crystals and it's id's



Number of chips: 1

	Channel 0	Channel 1
CE0	☑ 45DEA49276 WP Ready	☐ 2424242424
CE1	☐ 0000000000	☐ 2424242424
CE2	☐ 0000000000	☐ 2424242424
CE3	☐ 0000000000	☐ 2424242424

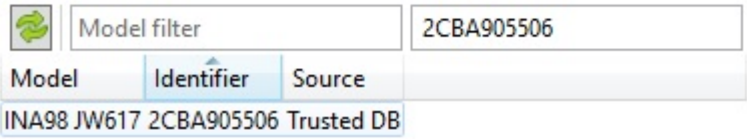
This section allows to see how many crystals chip consist of and also it display ID's. In this case chip have only one crystal.

The ID number contains a set of bytes where first one is most important since it is vendor byte:

- 2C (Micron)
- 45 (Sandisk)
- 89 (Intel)
- 98 (Toshiba)
- AD (Hynix)
- EC (Samsung)

In case of noise, the random ID may appear (e.g. ADADADAD; FFFFFFFF; 54654324 etc). In this scenario the chip has to be cleaned better.

Database

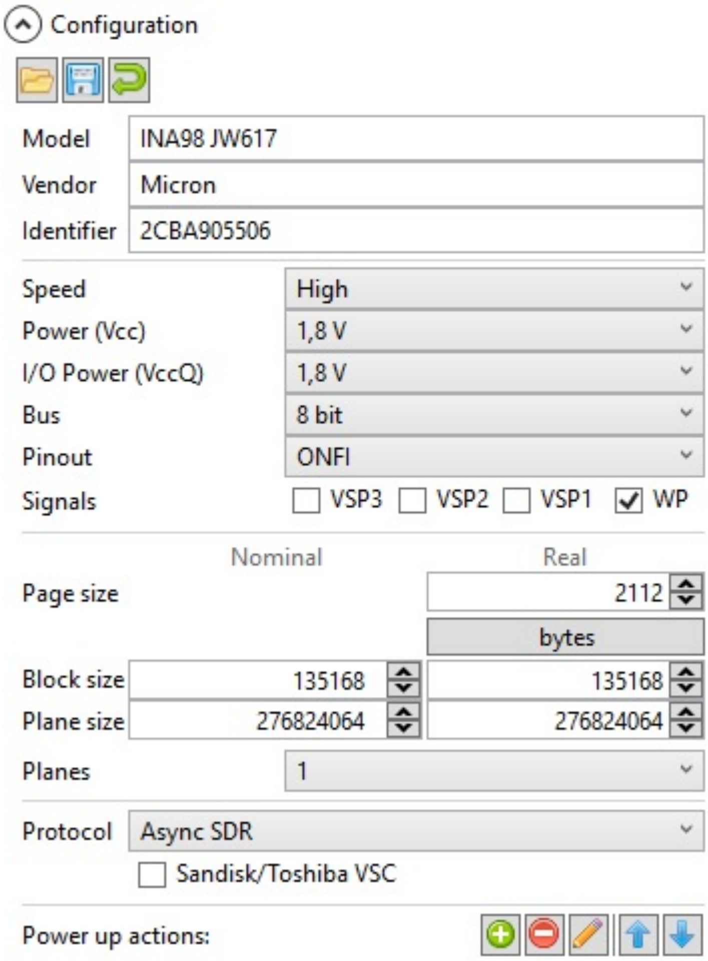


2CBA905506

Model	Identifier	Source
INA98 JW617	2CBA905506	Trusted DB

ID goes automatically to this section and it's possible to select proper chip configuration.

Configuration



Configuration

Model: INA98 JW617
Vendor: Micron
Identifier: 2CBA905506

Speed: High
Power (Vcc): 1,8 V
I/O Power (VccQ): 1,8 V
Bus: 8 bit
Pinout: ONFI
Signals: ☐ VSP3 ☐ VSP2 ☐ VSP1 ☑ WP

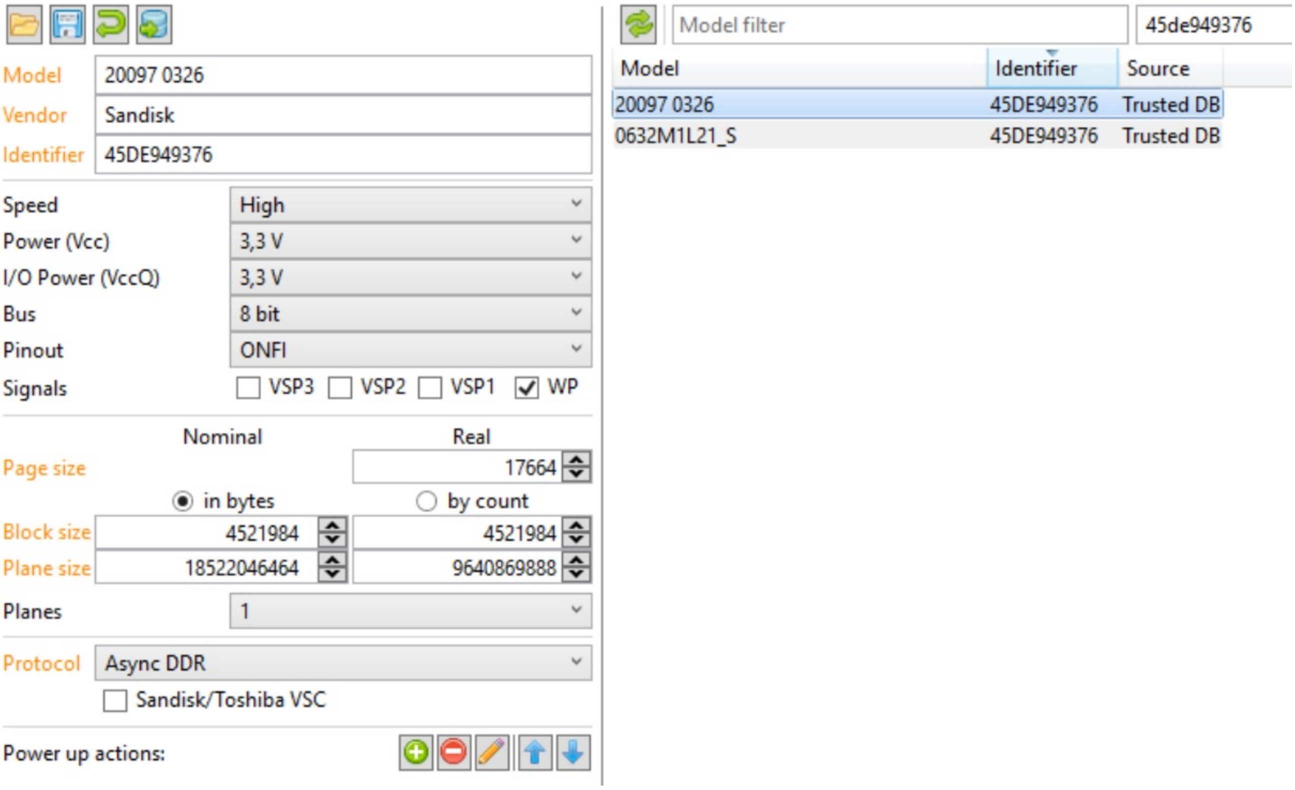
	Nominal	Real
Page size		2112
		bytes
Block size	135168	135168
Plane size	276824064	276824064

Planes: 1

Protocol: Async SDR
☐ Sandisk/Toshiba VSC

Power up actions:

In this sections we can observe settings of memory chip.



Model: 20097 0326
Vendor: Sandisk
Identifier: 45DE949376

Speed: High
Power (Vcc): 3,3 V
I/O Power (VccQ): 3,3 V
Bus: 8 bit
Pinout: ONFI
Signals: ☐ VSP3 ☐ VSP2 ☐ VSP1 ☑ WP

	Nominal	Real
Page size		17664
	● in bytes	○ by count
Block size	4521984	4521984
Plane size	18522046464	9640869888

Planes: 1

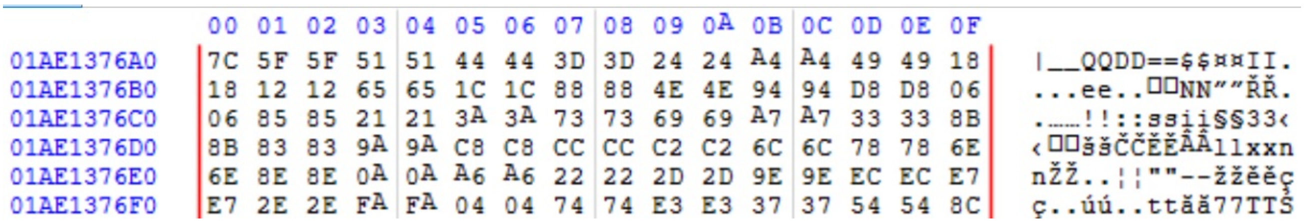
Protocol: Async DDR
☐ Sandisk/Toshiba VSC

Power up actions:

Model filter: 45de949376

Model	Identifier	Source
20097 0326	45DE949376	Trusted DB
0632M1L21_S	45DE949376	Trusted DB

In case of multiple configurations most likely the difference will be the protocol settings. In this situation, appropriate protocol must be found. Set DDR protocol in the first order, open Dump viewer on reader and check the data in the Hex viewer to examine if there are duplication of hex values.



```
            00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
01AE1376A0  7C 5F 5F 51 51 44 44 3D 3D 24 24 A4 A4 49 49 18   |__QQDD==$$¤¤II.
01AE1376B0  18 12 12 65 65 1C 1C 88 88 4E 4E 94 94 D8 D8 06   ...ee..□□NN””ŘŘ.
01AE1376C0  06 85 85 21 21 3A 3A 73 73 69 69 A7 A7 33 33 8B   .……!!::ssii§§33‹
01AE1376D0  8B 83 83 9A 9A C8 C8 CC CC C2 C2 6C 6C 78 78 6E   ‹□□ššČČĚĚÂÂllxxn
01AE1376E0  6E 8E 8E 0A 0A A6 A6 22 22 2D 2D 9E 9E EC EC E7   nŽŽ..¦¦""--žžěěç
01AE1376F0  E7 2E 2E FA FA 04 04 74 74 E3 E3 37 37 54 54 8C   ç..úú..ttăă77TTŚ
```

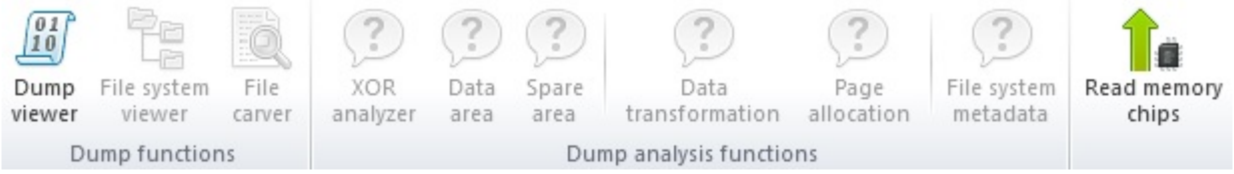
If bytes are duplicated like on picture, change protocol to SDR. If duplication of bytes doesn’t exist, then DDR protocol is

correct. Another step will be evaluation of chip quality in dump viewer.

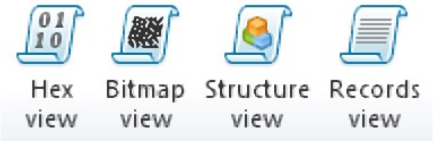
Evaluating of chip reading quality

After successfully configured chip, checking the quality of the dump should take place, if possible. Clicking the "Dump viewer" automatically turn the Reader on.

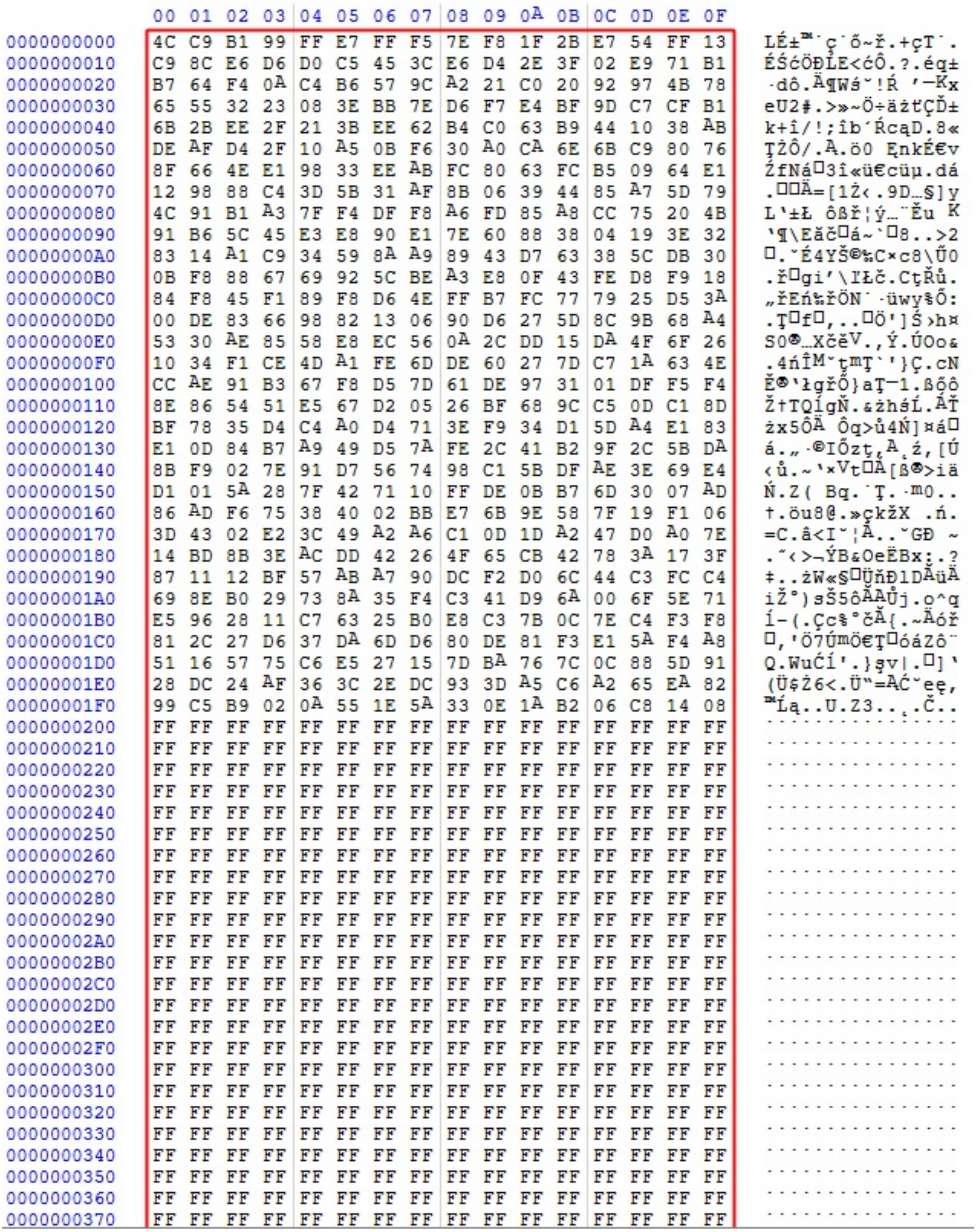
⚠ Do not remove NAND chip or adapter out of reader until power is turned OFF or Reader is unplugged.


Dump viewer
File system viewer
File carver
Dump functions
XOR analyzer
Data area
Spare area
Data transformation
Page allocation
File system metadata
Dump analysis functions
Read memory chips

The Dump Viewer function allows examination of the data in 2 different modes.

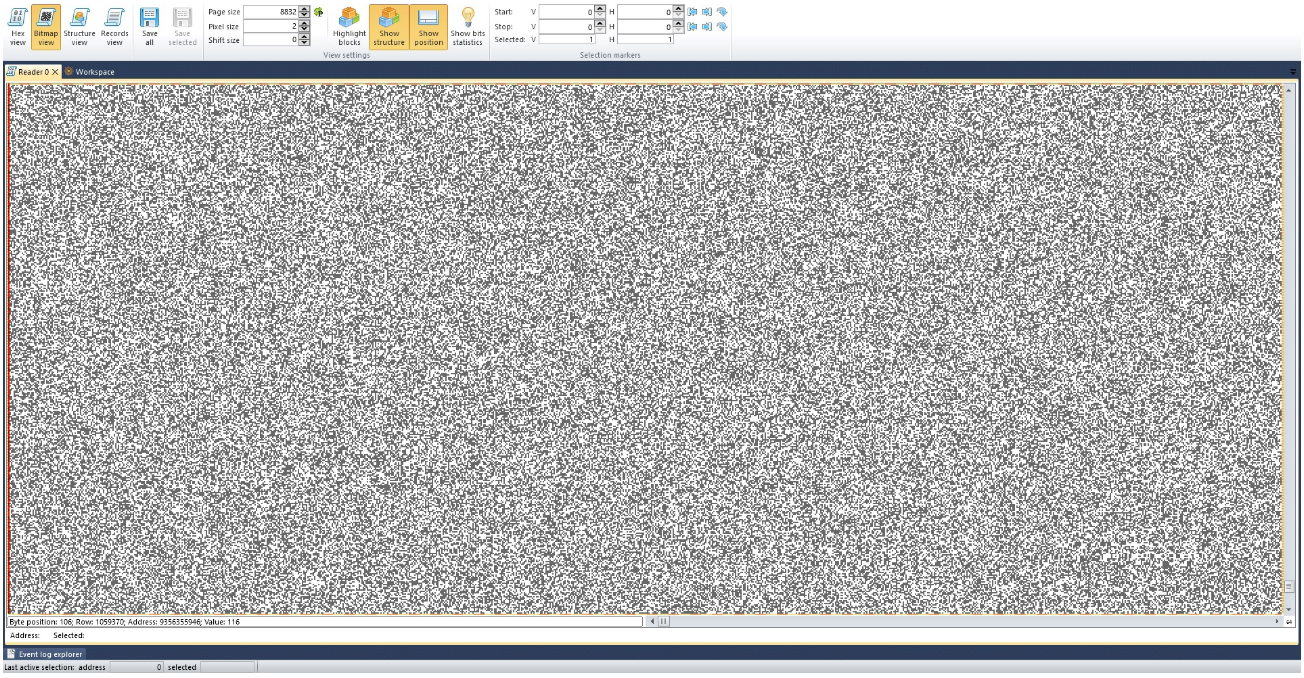


The Hex viewer displays data in a traditional hexadecimal values.



```
            00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000000000  4C C9 B1 99 FF E7 FF F5 7E F8 1F 2B E7 54 FF 13  LÉ±™˙ç˙ő~ř.+çT˙.
0000000010  C9 8C E6 D6 D0 C5 45 3C E6 D4 2E 3F 02 E9 71 B1  ÉŚćÖĐĹE<ćÔ.?.éq±
0000000020  B7 64 F4 0A C4 B6 57 9C A2 21 C0 20 92 97 4B 78  ·dô.Ä¶Wś˘!Ŕ ’—Kx
0000000030  65 55 32 23 08 3E BB 7E D6 F7 E4 BF 9D C7 CF B1  eU2#.>»~Ö÷äżťÇĎ±
0000000040  6B 2B EE 2F 21 3B EE 62 B4 C0 63 B9 44 10 38 AB  k+î/!;îb´ŔcąD.8«
0000000050  DE AF D4 2F 10 A5 0B F6 30 A0 CA 6E 6B C9 80 76  ŢŻÔ/.Ą.ö0 ĘnkÉ€v
0000000060  8F 66 4E E1 98 33 EE AB FC 80 63 FC B5 09 64 E1  ŹfNá□3î«ü€cüµ.dá
0000000070  12 98 88 C4 3D 5B 31 AF 8B 06 39 44 85 A7 5D 79  .□□Ä=[1Ż‹.9D…§]y
0000000080  4C 91 B1 A3 7F F4 DF F8 A6 FD 85 A8 CC 75 20 4B  L‘±Ł ôßř¦ý…¨Ěu K
0000000090  91 B6 5C 45 E3 E8 90 E1 7E 60 88 38 04 19 3E 32  ‘¶\Eăč□á~`□8..>2
00000000A0  83 14 A1 C9 34 59 8A A9 89 43 D7 63 38 5C DB 30  □.ˇÉ4YŠ©‰C×c8\Ű0
00000000B0  0B F8 88 67 69 92 5C BE A3 E8 0F 43 FE D8 F9 18  .ř□gi’\ľŁč.CţŘů.
00000000C0  84 F8 45 F1 89 F8 D6 4E FF B7 FC 77 79 25 D5 3A  „řEń‰řÖN˙·üwy%Ő:
00000000D0  00 DE 83 66 98 82 13 06 90 D6 27 5D 8C 9B 68 A4  .Ţ□f□‚..□Ö']Ś›h¤
00000000E0  53 30 AE 85 58 E8 EC 56 0A 2C DD 15 DA 4F 6F 26  S0®…XčěV.,Ý.ÚOo&
00000000F0  10 34 F1 CE 4D A1 FE 6D DE 60 27 7D C7 1A 63 4E  .4ńÎMˇţmŢ`'}Ç.cN
0000000100  CC AE 91 B3 67 F8 D5 7D 61 DE 97 31 01 DF F5 F4  Ě®‘łgřŐ}aŢ—1.ßőô
0000000110  8E 86 54 51 E5 67 D2 05 26 BF 68 9C C5 0D C1 8D  Ž†TQĺgŇ.&żhśĹ.ÁŤ
0000000120  BF 78 35 D4 C4 A0 D4 71 3E F9 34 D1 5D A4 E1 83  żx5ÔÄ Ôq>ů4Ń]¤á□
0000000130  E1 0D 84 B7 A9 49 D5 7A FE 2C 41 B2 9F 2C 5B DA  á.„·©IŐzţ,A˛ź,[Ú
0000000140  8B F9 02 7E 91 D7 56 74 98 C1 5B DF AE 3E 69 E4  ‹ů.~‘×Vt□Á[ß®>iä
0000000150  D1 01 5A 28 7F 42 71 10 FF DE 0B B7 6D 30 07 AD  Ń.Z( Bq.˙Ţ.·m0..
0000000160  86 AD F6 75 38 40 02 BB E7 6B 9E 58 7F 19 F1 06  †.öu8@.»çkžX .ń.
0000000170  3D 43 02 E2 3C 49 A2 A6 C1 0D 1D A2 47 D0 A0 7E  =C.â<I˘¦Á..˘GĐ ~
0000000180  14 BD 8B 3E AC DD 42 26 4F 65 CB 42 78 3A 17 3F  .˝‹>¬ÝB&OeËBx:.?
0000000190  87 11 12 BF 57 AB A7 90 DC F2 D0 6C 44 C3 FC C4  ‡..żW«§□ÜňĐlDĂüÄ
00000001A0  69 8E B0 29 73 8A 35 F4 C3 41 D9 6A 00 6F 5E 71  iŽ°)sŠ5ôĂAŮj.o^q
00000001B0  E5 96 28 11 C7 63 25 B0 E8 C3 7B 0C 7E C4 F3 F8  ĺ–(.Çc%°čĂ{.~Äóř
00000001C0  81 2C 27 D6 37 DA 6D D6 80 DE 81 F3 E1 5A F4 A8  □,'Ö7ÚmÖ€Ţ□óáZô¨
00000001D0  51 16 57 75 C6 E5 27 15 7D BA 76 7C 0C 88 5D 91  Q.WuĆĺ'.}şv|.□]‘
00000001E0  28 DC 24 AF 36 3C 2E DC 93 3D A5 C6 A2 65 EA 82  (Ü$Ż6<.Ü“=ĄĆ˘eę‚
00000001F0  99 C5 B9 02 0A 55 1E 5A 33 0E 1A B2 06 C8 14 08  ™Ĺą..U.Z3..˛.Č..
0000000200  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000210  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000220  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000230  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000240  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000250  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000260  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000270  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000280  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000290  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
00000002A0  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
00000002B0  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
00000002C0  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
00000002D0  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
00000002E0  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
00000002F0  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000300  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000310  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000320  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000330  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000340  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000350  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000360  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
0000000370  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙˙
```

The Bitmap viewer - represents the data in a visual binary form. It helps visualizing distribution of data areas, ecc, spare areas. The bitmap mode should be used for data quality examination.


Hex view
Bitmap view
Structure view
Records view
Save all
Save selected
Highlight blocks
Show structure
Show position
Show bits statistics
View settings
Selection markers
Reader 0
Workspace
Event log explorer

Page size 8832
Pixel size 2
Shift size 0

Start: V 0 H 0
Stop: V 0 H 0
Selected: V 1 H 1

Byte position: 106; Row: 1059370; Address: 9356355946; Value: 116

Address: Selected:

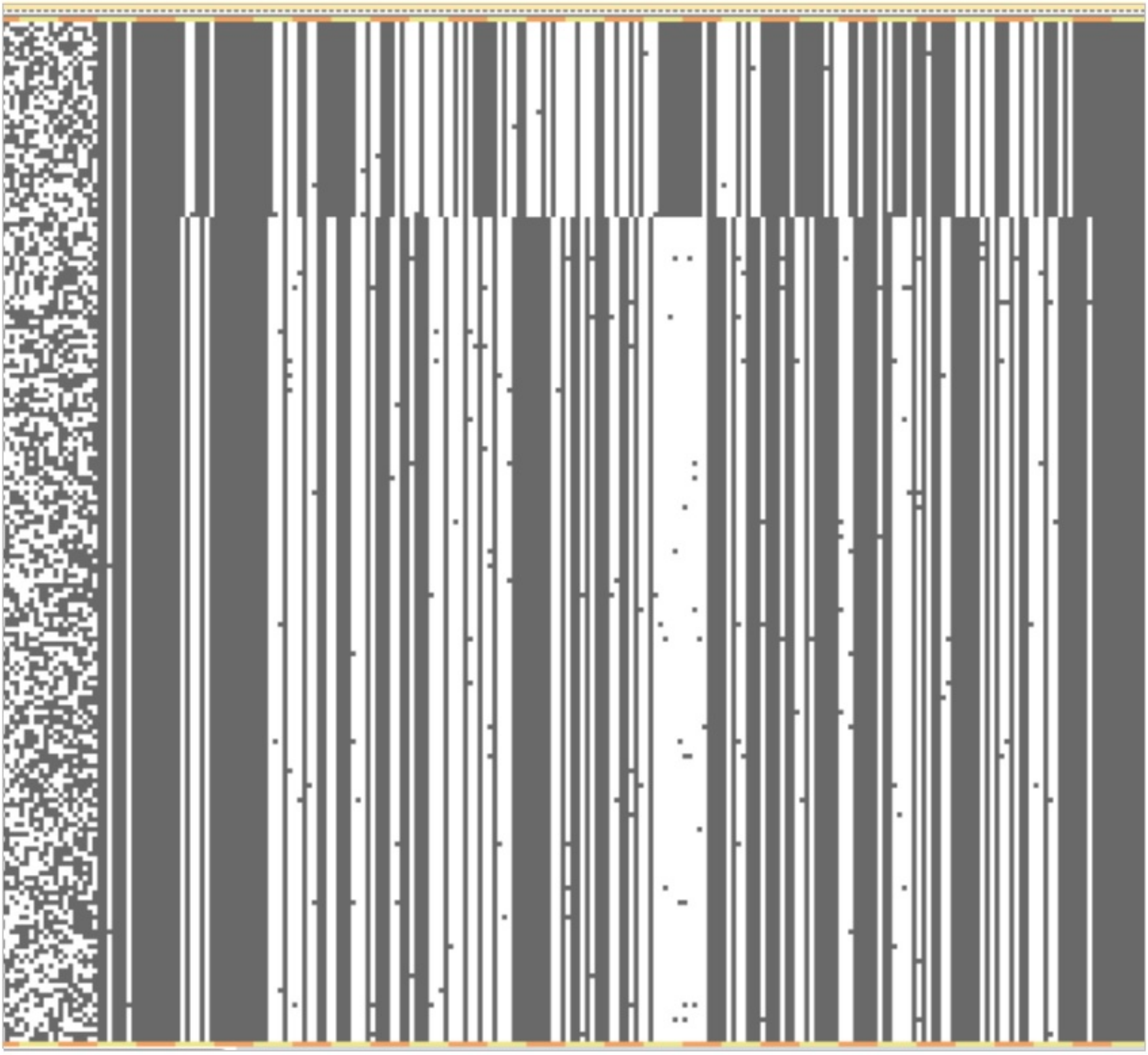
Last active selection: address 0 selected

With connected chip, the Dump viewer has direct access to NAND. In order to check the quality of data, analysis of the image must be done.

> Now the image of the chip is being read on the fly and is not saved into file.

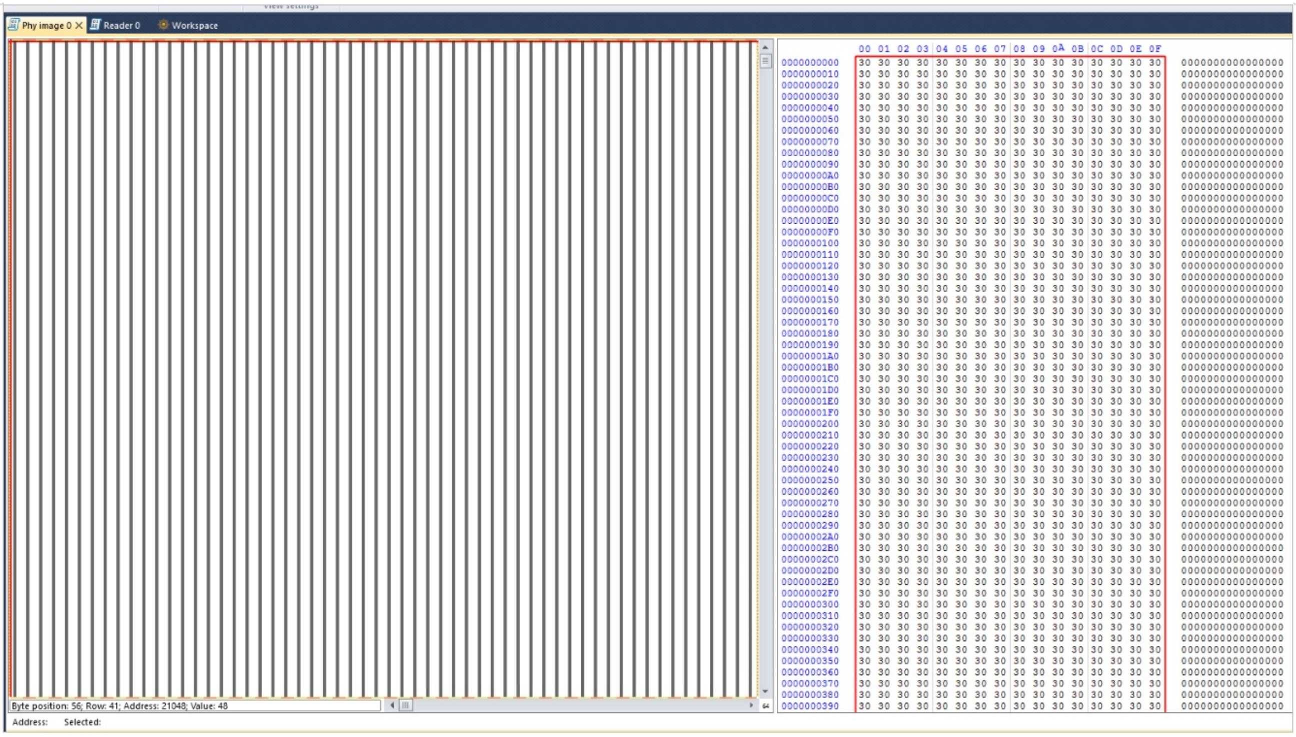
The next step is checking whether the dump is readable and contains acceptable

amount or no bit errors. Bit errors look like randomly scattered bad pixels. Adjusting voltage level can be helpful here.



The detailed process of minimizing bit errors is described in this article. Analysis of bit errors in NAND and power adjustment.

Vertical stripes indicate problem with connection. It’s default response from the Reader if it didn’t receive any data from the chip. The value in Hex would be 30.

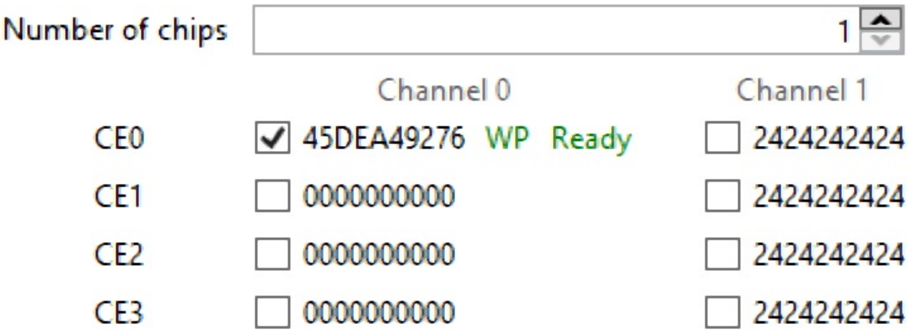


```
           00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000000000 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000010 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000020 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000030 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000040 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000050 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000060 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000070 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000080 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000090 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000000A0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000000B0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000000C0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000000D0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000000E0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000000F0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000100 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000110 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000120 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000130 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000140 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000150 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000160 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000170 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000180 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000190 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000001A0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000001B0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000001C0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000001D0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000001E0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000001F0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000200 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000210 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000220 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000230 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000240 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000250 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000260 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000270 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000280 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000290 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000002A0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000002B0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000002C0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000002D0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000002E0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
00000002F0 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000300 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000310 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000320 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000330 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000340 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000350 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000360 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000370 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000380 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
0000000390 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30  0000000000000000
```

Byte position: 56; Row: 41; Address: 21048; Value: 48

Chip reading

When everything is done dump reading can be started.
To read dump, go to configuration and in crystal section select crystals and set how many chips you want to read.



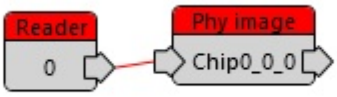
Number of chips: 1

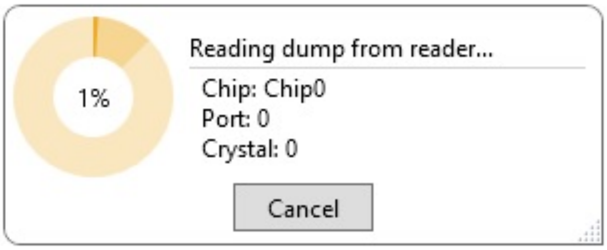
	Channel 0	Channel 1
CE0	☑ 45DEA49276 WP Ready	☐ 2424242424
CE1	☐ 0000000000	☐ 2424242424
CE2	☐ 0000000000	☐ 2424242424
CE3	☐ 0000000000	☐ 2424242424

After this click 'Read memory chips'.

Read memory chips

Then VNR create physical image for each crystal and then start read the dump from each.


Reader
0
Phy image
Chip0_0_0



Reading dump from reader...

Chip: Chip0
Port: 0
Crystal: 0

https://support.rusolut.com/portal/en/kb/articles/read-chip